ATC COTS
Commercial Off The Shelf

High Reliability Certification Program

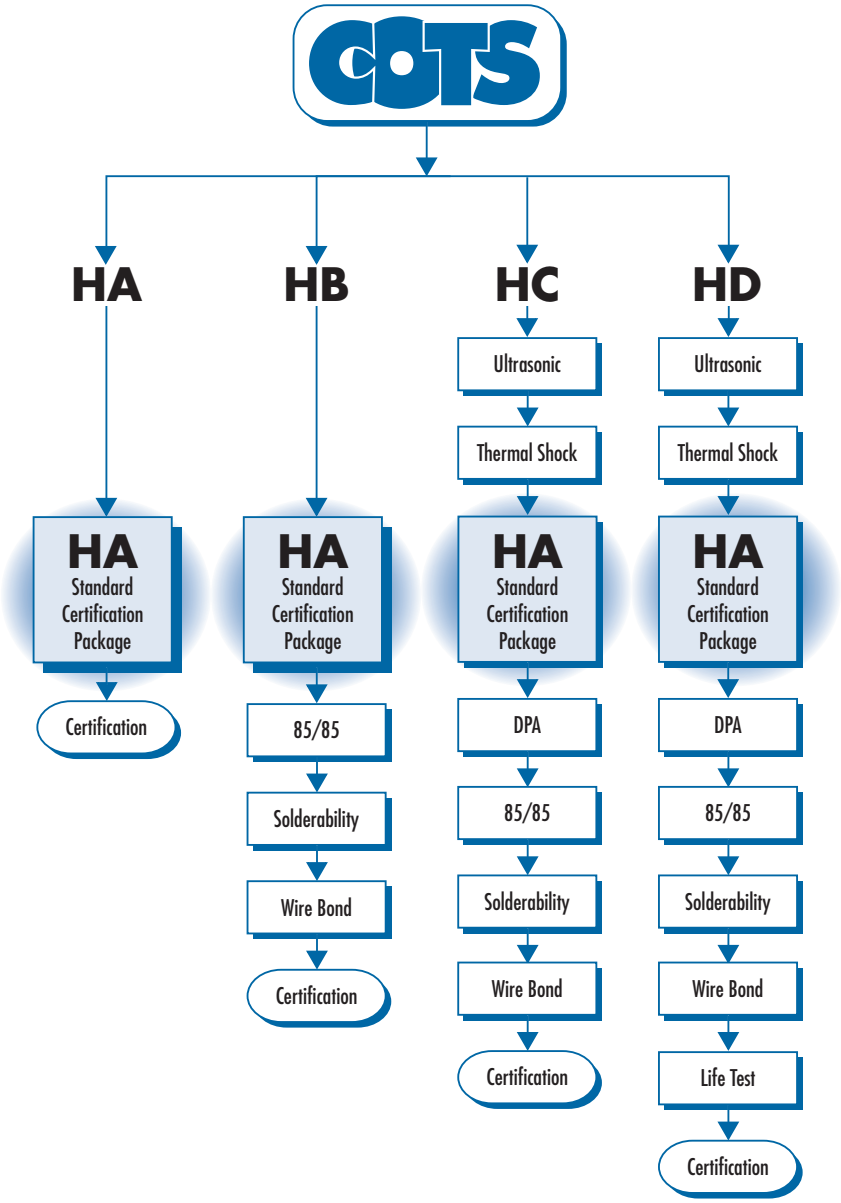
ATC
Commercial Off-the-Shelf (COTS)
High Reliability Certification Program

A ***Cost Effective*** approach to qualifying standard products for enhanced reliability applications.

A ***Flexible*** program offering standard screening packages with options to support specifics of customer-driven program requirements.

Applications:

- Ruggedized Commercial *(Medical, Industrial, Telecommunications)*
- Military *(Ground, Naval, Airborne)*
- Space/Satellite



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THE ENGINEERS' CHOICE®
ISO 9001 REGISTERED COMPANY

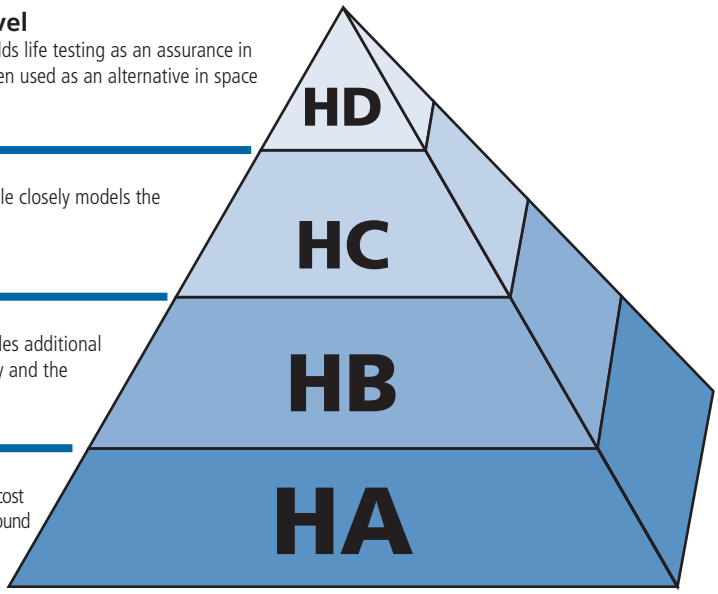
ATC COTS Screening Options

Highest Screening Level
HD: The highest screening option adds life testing as an assurance in mission critical applications and is often used as an alternative in space qualified applications.

Airborne Applications
HC: Often used in airborne applications, this profile closely models the military specifications.

Additional Sample Testing
HB: Built upon our standard HA Screening, this program provides additional sample testing to certify the termination for attachment integrity and the ability to survive and perform in high humidity environments.

Standard Upscreen Package
HA: ATC's Standard Hi Rel certification screening profile is typically used as a lower cost means to certify product reliability. HA screening is used throughout the industry in ground based military applications as well as stringent commercial applications.



COTS Up-Screening

ATC COTS Hi-Rel Certification and the Standard Certification Package

COTS initiatives have ignited a fast-growing industry of test labs specializing in up-screening of commercial products for Hi-Rel applications. Recognizing the need for this service, ATC offers its extensive test laboratory facilities for COTS upscreening in a well-defined, modular package. ATC COTS upscreening is faster and more cost-effective than that of general purpose commercial test laboratories.

An increasing number of users are seeking to further reduce costs by eliminating their own source control drawings where possible. In such instances a standard Hi-Rel screening offering from a supplier simply requires the user to identify the supplier's Hi-Rel part number. Such standard offerings can be provided at substantially lower costs than those programs imposed by customized source control drawings.

ATC's mature and knowledgeable test laboratory staff offer years of experience in high reliability testing, medical, military and aerospace quality conformance inspection and reliability programs.

As a supplier of high reliability products to the military, aerospace and telecommunications industry for over thirty years, ATC has participated in government programs for evaluation of HALT (Highly Accelerated Life Testing) as well as the development of reliability test requirements for MIL-PRF-55681 and MIL-PRF-123. During this time ATC has focused extensive work in the characterization of failure mechanisms in ceramic capacitors. Our experience in this field led us to develop a standard Hi-Rel Certification Package that is guaranteed to ensure a capacitor manufacturing lot or inspection lot is free of residual mechanisms for early failure.

The COTS Certification Package is designed to ensure that any infant mortality subpopulation is identified and weeded out. This screen is designed to be more effective than that of the military established reliability specification MIL-PRF-55681 and the space level specification MIL-PRF-123.

In performance-critical applications requiring ruggedized or certified components, ATC COTS up-screening is the answer.

ATC High Reliability Experience

ATC – The leader in High Performance RF Capacitors

ATC was the first company to obtain qualification listing to the high frequency specification sheets of MIL-PRF-55681.

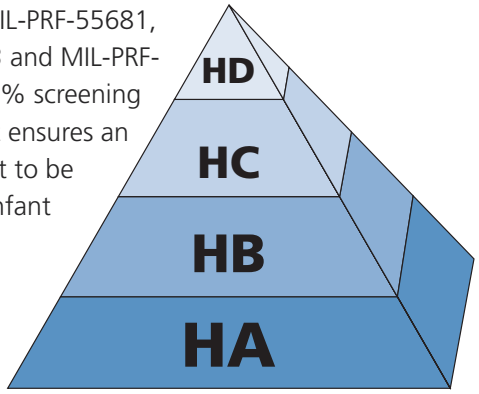
ATC products are known for their high power handing capability and reliability in mission critical applications.

The ATC 100 (BG) and 700 (BP) series capacitor chips are qualified to the "S" failure rate level. These products have been routinely and successfully used in space, satellite, military and telecommunication applications, where component failure cannot be tolerated.

The ATC standard catalog product is produced on the same manufacturing line as the ATC QPL product, with the identical procedures and controls. These are offered to you as high quality and high reliability COTS.

has been designed to satisfy virtually all high reliability applications. This ensures the highest quality upscreened COTS in the industry today.

The "HA" incorporates the best aspects of MIL-PRF-55681, MIL-STD-883 and MIL-PRF-123 in a 100% screening regimen that ensures an inspection lot to be free of any infant mortality.



ATC's Recommended Hi-Rel Certification Package "HA"

P/N Prefix				Evaluation Operation	Sample Size
HA	HB	HC	HD		
		X	X	Ultrasonic Screening †	100%
		X	X	Thermal Shock (5 Cycles for HC and 20 Cycles for HD)	100%
X	X	X	X	Standard Hi-Rel Certification Package (HA)	100%
		X	X	Destructive Physical Analysis	see table*
	X	X	X	85/85 (Low Voltage Moisture Humidity)	13 units*
	X	X	X	Solderability (Solderable or Solder Coated Only)	5 units*
	X	X	X	Wire Bond Test (Gold Terminated Chips Only)	13 units*
			X	Life Test (2000)	25 units*

** Additional sample units required that have passed the 100% testing along with the deliverable (flight) quantity.*

† Not applicable to SLC's or MLC's of sizes 0603 and smaller.

DPA Sample Table	
Lot Size	Sample
1 - 500	14
501 - 10,000	32
10,001 - 35,000	50
35,001 -	80

Standard Hi-Rel Certification Package (HA)

Voltage Conditioning (Burn-In) exposure per MIL-PRF-55681 with the following conditions:

1. Applied DC voltage: 200 % WVDC for WVDC's of 500 or less
   120 % WVDC for WVDC's of 1250 or less
   100 % WVDC for WVDC's > 1250

   Burn-in duration shall be 100 hours, except where there are failures it may be extended up to 300 hours.
   Burn-in shall be discontinued when 100 failure-free hours have been accumulated or when the PDA (Parts Defective Allowance) has been exceeded.

2. DWV: Applied DC voltage: 250 % WVDC for WVDC's of 500 or less
   150 % WVDC for WVDC's of 1250 or less
   120 % WVDC for WVDC's > 1250

3. IR: Applied DC voltage: At WVDC, except above WVDC's of 500 volts, the applied voltage shall be 500 volts.

4. Capacitance and Dissipation Factor

5. Visual @ 20 X

6. The PDA for steps 1 through 5, shall be 3 percent and the time between failures must be increasing at the end of voltage conditioning.

7. The final fault-free 100-hour interval shall also verify that any prior observed TBF (Time Before Failure) is increasing.

Comparisons

MIL-PRF-123

Voltage conditioning per MIL-PRF-123 is established at 168 hours minimum. It may be extended to 264 hours. The PDA is 3 percent and the last 48 hours of burn-in must exhibit less than 1 unit or 0.1 percent (whichever is greater) failed units.

NOTE: A decreasing failure rate is not certified.

MIL-PRF-55681

Voltage conditioning per MIL-PRF-55681 is established at 100 hours. It cannot be extended. The PDA is 8 percent.

NOTE: A decreasing failure rate is not certified.

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American Technical Ceramics Corp.

Manufacturing Process Flow